ISSN 0824 5134

Centre for
Criminological
Research

Producing Personal Safety: Parallel Production, Police, Fear, and Crime

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Discussion Paper 6

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by

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March 1985

Abstract

Aggregate data from a sample of 23 Canadian cities are used to examine relationships among crime rates, police staffing rates, fear of crime, and citizens' crime prevention behaviors. Bivariate and path analyses reveal positive correlations between fear of crime and parallel production (crime prevention behaviors), and negative impacts of police force size on such behaviors. Crime rates have both direct and indirect positive effects (via fear of crime) on parallel production, while police force size do not have any real effect on fear of crime.

Individual citizens' responses to crime are of three general types (Lavrakas and Herz, 1982). People can take personal protective measures, including restricting their own behaviors. Second, they can attempt to prevent property loss by creating physical barriers (e.g. special locks) and psychological barriers (e.g. leaving lights on when gone) to deter potential offenders. Third, citizens can work together formally with fellow residents to prevent crime through patrolling, escorting, and block-watching (Lavrakas and Herz, 1982:480).

While there is evidence of high levels of fear of crime among urban residents, this does not appear to have been translated into extensive formal participation in crime prevention programs (Dubow and Podolefsky, 1982). One explanation of this paradox emphasizes the common belief that crime prevention is the role of the police. This "professional" model calls for more formal intervention in deterring crime on the street (Balkin and Houlden, 1983). However, self-protective and property-protective behavior do appear to be widespread.

When examining the extent of these individual responses to crime, several important influencing factors need to be considered. The degree of concern that people have about crime, actual crime rates, and the degree to which the police play a role in controlling crime could influence citizens' responses. This subject becomes particularly interesting when we note the increasing costs of policing which have led to speculations that personal crime prevention efforts will increase because of the lowered levels of police service (Lavrakas and Herz, 1982). These questions can be addressed in the broader context of the recent literature on "coproduction" in urban service delivery.

Citizen Involvement in Service Delivery

Citizen involvement in public service delivery can be of three different types: coproduction, ancillary production, and parallel production (Warren, et al., 1984). Coproduction involves interactions between individuals or groups and public agencies that augment or contribute to the provision of urban services. In the area of security maintenance, this could include involvement with the police in joint programs such as property identification, community policing, and neighborhood programs of crime

identification and prevention. Ancillary production is defined as citizen contributions to service delivery through individual actions such as serving on juries, paying taxes, and teaching children to obey laws. Basically, ancillary production of crime prevention services appears to involve being a good citizen.

Individual initiatives which contribute to municipal service provision but do not involve direct interaction with a public body (as in coproduction) or indirect interactions (as in ancillary production) are defined by Warren et al. (1984) as parallel production. Such activities include the two crime prevention strategies outlined by Lavrakas and Herz (1982): property protection through "target hardening" (e.g. putting locks on doors and bars on windows) or purchase of guard animals, and personal protection through purchase of weapons, learning self-defense, or changing of behavior patterns (e.g. avoiding unsafe areas of a city). Consistent with the findings related above, when urban residents are asked about their contributions to crime prevention services they are much more likely to report parallel production (particularly target hardening behavior) than coproduction (Warren et al., 1982, 1984).

The research on coproduction and parallel production of crime prevention services is accumulating slowly, with more emphasis on the latter (since it is more prevalent). A number of studies have focused on the characteristics of urban residents more likely to engage in such behavior (Warren et al., 1984), demonstrating that higher income and younger citizens are more involved, as are previous victims of crimes. Recognition of these patterns has led to discussions of equity in urban service provision (Warren et al., 1984:460). Citizens with greater need may be less able to take personal initiatives in crime prevention if public agencies become less active in this respect.

Equally important in these studies are the attempts to isolate factors in the community, such as fear of crime, that might trigger this behavior. Rosentraub, et al. (1983) use fear of crime as an independent variable and report that greater fear is associated with parallel production behavior. Riger, et al. (1982) similarly note that women who express greater fear also are more likely to restrict their movement in the city. But Warren, et al. (1982:52) use "fear of crime" as a dependent variable

when reporting the positive correlation between fear and parallel production. Later in their analysis they state that there is no systematic relationship between parallel production and fear (p. 52). Warren et al. (1984:452), repeat this finding. Meanwhile, Dubow and Podolefsky (1982) show that coproduction is more a function of community-mindedness than of fear, while fear of crime more directly influences parallel production behavior. It is apparent that, using individual-level data, the nature of the relationship between fear of crime and individual responses to crime has not been completely resolved.

The degree to which crime rates and the size of local police forces might influence individual crime prevention behaviors has received little attention, although there is a small research literature on the relationship between community characteristics and fear of crime (Hartnagel, 1979; Kennedy, and Silverman, forthcoming). Riger, et al. (1982) found some relationship between crime rates and personal protection strategies, but only through fear. Lavrakas and Herz (1982) report similar findings. The small amount of research in this area is probably due to the absence of data from a sample of cities. Warren et al. (1984) do examine survey data from two Texas cities, but their analysis focuses primarily on individual characteristics which affect parallel production.

In this paper we begin to address this research vacuum. Our focus is on characteristics of cities which may have an effect on parallel production, which we separate into personal protection and home protection behavior. The major independent variables we examine are property and violent crime rates, and the size of the local police force, while the average age of city residents, the percentage owning their own homes, and the size of the city are used as control variables.

The average fear of crime in the city is modelled as an intervening variable between these city characteristics and parallel production behavior. Our rationale for proposing that fear is a cause rather than an effect of crime prevention behavior is based on the repeated finding of a positive correlation between fear and parallel production. An argument that fear of crime is affected by individuals' protective behavior could be supported by a negative correlation - the more precautions taken

(e.g. locking doors, installing alarms, not going out at night), the less the fear. While a positive correlation might also be used to defend a "fear as outcome" hypothesis (taking precautions may reduce risks but still enhance fear), it seems more plausible to suggest a "fear as cause" hypothesis (individuals more frightened of crime take more precautions).

Sampling and Measurement

The Ministry of State for Urban Affairs (no longer in existence) commissioned a study of the attitudes and behavior of urban Canadians which was undertaken between October of 1978 and January, 1979. Among the many questions asking respondents to evaluate their city, their neighborhood, their housing, and various urban policies, the questionnaire included questions about fear of crime and behavioral responses to crime. Individual responses to these questions, aggregated to form city averages, are analyzed in this paper.

The Urban Concerns Survey was completed in 23 Canadian cities (see Table 1), only one of which (Charlottetown) had a population of less than 100,000. The sampling design was intended to provide large enough samples in each city to allow city comparisons as well as national estimates. In addition, enough interviews were completed in each of three zones (inner city, mature suburbs, new suburbs) in the smaller cities, and in each of four zones (the three above and a fourth outer zone) in the seven larger cities, to allow inter-zone comparisons. The goal was to complete 450 interviews (150 in each of the three zones) in the smaller cities and 600 in the larger cities. A systematic sampling strategy was used to obtain an average of six respondents (randomly selected from among adults living in the selected household) in each of 25 Enumeration Areas in each zone. An initial sample of 16,840 households resulted in a final sample of 11,061 completed interviews (a response rate of 64% across all cities).

This very large and carefully collected data set contains weights (both individual and household) for national estimates, for city estimates, and for within-city zone estimates. For this analysis in which the city is the unit of analysis (and city characteristics are derived from individuals' self-reports of their attitudes and behavior),

city respondent weights were used. This weighting procedure ensures that zones within cities are represented proportionate to their population, and allows inter-city comparisions.

The 11,061 respondents in this survey were asked if they had "taken any precautions to protect yourself or your home from crime?" A total of 59.3% answered "yes" and these individuals were then asked to list all of the precautions they had taken. Interviewers recorded answers to this second question as either property protective behavior or personal protection. Protection of property was a more frequent type of response, with 35% of the total sample saying they locked their homes, 22% saying they had installed special locks or bolts, 16% noting that they left lights or a radio on when away from home, 9% saying they had bought a dog, and 3% reporting the installation of alarms. Seventeen percent added some "other" form of property protective behavior. In the area of personal protection, 20% of the total sample said their precautions included avoidance behavior (e.g. not walking alone at night), and 1.4% said they had taken a self-defence course. Carrying a gun was extremely uncommon (n = 26 or 0.2%), as was carrying a whistle or alarm (0.5%) or carrying some other weapon (1.3%). "Other" personally protective behaviors were reported by 5% of the total sample. An index of "property protection behavior" was created for each respondent by adding the number of such actions reported, as was an index of "personal protective behavior." The city averages of these two indices are used as measures of "parallel production" in the following analyses.

Survey respondents were also asked: "How much do you worry about crime in this area?" They could choose their response from among: "a great deal," "some," "a little," and "not at all." The city average of responses to this question (with higher values signifying greater fear) are used as our measure of "fear of crime" in these 23 Canadian urban centres. These survey data were also used to calculate the average age of respondents in each city, and the proportion of respondents in each city who reported owning their own home. These statistics, for each of the 23 urban centres, became the values for two of the control variables used in the analyses. A third control variable was the population size of the city (from 1976 census data).

Property crime rates and violent crime rates are important explanatory variables in this study. Rates per 100,000 population for 1978 were obtained from Statistics Canada (1978) for each of the cities in our sample.[1] Size of the local police force is a third essential explanatory variable. The number of police officers per 1000 population (a three year average) was obtained from Statistics Canada (1980) for 19 of the 23 cities in the sample.

Results

Our study of parallel production of crime-prevention services begins with a brief examination of differences across the 23 cities in fear of crime, crime rates and the police staffing rate, and the extent of property protection and individual protection behavior among residents. In Table 1, the cities are ranked according to the average response to the "worry about crime" question. There appears to be some relationship between crime rates and fear of crime, particularly for violent crime rates, with cities like Edmonton and Hamilton which are at the top of the fear list reporting relatively high rates of crime.[2] One obvious exception to this pattern is Victoria which reported very high crime rates and relatively low levels of worry about crime. In the following analyses we check to see whether this "outlier" has any important effects on the overall pattern of relationships.

A quick look at the police staffing rates in these urban centres suggests that they are not related in the same systematic manner to either crime rates or the fear of crime averages. The measures of parallel production appear to covary positively with crime rates. For example, Edmonton and Calgary residents exhibit, on the average, the most personal protective behavior and are also among the most likely to take home protection precautions. Table 1 also shows these two cities to be relatively high in crime rates and at the top of the "fear of crime" scale. Further individual city

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[1]Ottawa rates alone are used for the Ottawa/Hull urban area, and Chicoutimi rates are used for the Chicoutimi/Jonquiere urban area. In both cases, the difference between the single city rates and a weighted estimate of the combined rates is too small to have any appreciable effect on the analysis results.

[2]These results are similar to those reported by Creechan (1981) who analyzed "fear of crime" data from the 1977 York University "Quality of Life in Canada" survey. His results from a somewhat smaller and different set of cities also showed a positive correlation between crime rates and fear of crime, and higher levels of fear in a number of western Canadian cities.

Table 1: Fear of crime, crime rates, policing and parallel production of crime prevention services in 23 Canadian cities.

City	worry about crime[a]	property crime rate[b]	violent crime rate[b]	police per 1000 pop[c]	property protection[d]	personal protection[e]
Edmonton	2.76	8185	1092	1.78	1.45	.52
Hamilton	2.56	7044	1134	1.68	.95	.27
Calgary	2.48	5397	536	1.89	1.59	.59
Thunder Bay	2.47	6757	932	----	1.16	.27
Halifax	2.47	7722	1008	2.13	.75	.19
Regina	2.46	8270	677	1.82	1.17	.34
Vancouver	2.42	8470	1329	1.65	1.62	.28
Saskatoon	2.40	5937	582	1.79	1.02	.34
Winnipeg	2.35	5920	372	1.80	1.08	.36
Ottawa/Hull	2.30	7492	642	1.64	1.03	.27
Toronto	2.30	4750	617	1.94	.88	.29
Kitchener/ Waterloo	2.27	5397	506	1.49	1.05	.31
St. John	2.26	3269	750	2.31	1.07	.31
Victoria	2.26	12591	1156	1.76	1.39	.34
Montreal	2.25	4880	674	2.35	.79	.14
St. Catherines/ Niagara	2.23	6378	630	----	1.16	.30
St. John's	2.18	5774	487	2.45	.61	.14
Windsor	2.15	6020	1099	1.91	1.06	.38
Sudbury	2.15	4722	382	1.23	1.06	.32
London	2.14	5948	793	1.40	.88	.32
Charlottetown	2.12	4497	581	----	.88	.10
Quebec	2.08	6336	729	1.81	.65	.23
Chicoutimi/ Jonquiere	2.00	3280	304	----	.54	.12

a. "How much do you worry about crime in this area?" A great deal = 4; Some = 3; A little = 2; Not at all = 1. City averages computed using city proportional weights.

b. 1978 crime rates per 100,000 population. Source: Statistics Canada(1978); Crime and Traffic Enforcement Statistics, Catalogue 85-205, Table 3.

c. Source: Statistics Canada (1980:225). Three year average (1975-77).

d. City average of number of property protection actions taken; city proportional weights.

e. City average of number of personal protection actions taken; city proportional weights.

comparisions could be made, but an examination of correlations among these variables would be more useful.

Table 2 displays zero-order and partial correlations among these five central variables and the three control variables. Looking first at the zero-order correlations, we observe a strong positive association (r = .76) between the two parallel production measures. In cities where residents tend to take home protection precautions, personal protection behaviors are also more wide-spread. The measure of average fear of crime has a moderate size positive correlation with both the property (r = .59) and individual (r = .55) parallel production variables. As we argued earlier, a positive correlation between measures of fear and parallel production seems best explained by a "fear as cause" model: individuals more frightened of crime tend to make more efforts to protect themselves and their property. With aggregate data such as these, the interpretation becomes: in cities where fear of crime is greater, individual citizen responses are more frequently observed.

As our quick examination of the raw data in Table 1 suggested, crime rates are positively associated with fear of crime (correlations of .47 and .43).[3] Both types of crime rates also have moderate strength positive correlations with property protection initiatives (.44 and .49), but their relationships with self-protective behavior, although still positive, are relatively weak in strength (.18 and .26). Thus, while the strength of the relationship varies depending on the type of crime rates under consideration, we do see evidence that higher crime rates are accompanied by increases in individual attempts to reduce the chances of being a victim of such crimes.

The zero-order correlations involving the police staffing rate variable reveal some interesting relationships. Size of the local police force appears to have no effect on average level of fear of crime (r = .01). In other words, the presence of

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[3]As noted in Table 2, the omission of Victoria from the analysis increases the zero-order correlation between fear of crime and property crime rates from .43 to .65. Victoria's high crime rate and low level of fear is obviously contrary to the typical pattern revealed in these correlations. There is only one other instance where the omission of this outlying case alters a correlation coefficient significantly. The zero-order correlation between property crime rates and self-protective behavior is reduced from .31 to .13 (Table 2).

Table 2: Zero-order and partial correlations.[a]

	2.	3.	4.	5.	6.	7.	8.	9.
1. Fear of crime	.59 .60	.55 .61	.47 .57	.43(.65)[b] .49(.62)[b]	.01 .14	.07	-.22	.10
2. Property protection		.76 .80	.44 .47	.49 .51	-.33 -.27	-.06	.07	.24
3. Personal protection			.18 .30	.26 .31(.13)[b]	-.35 -.21	-.12	-.25	.22
4. Violent crime rate				.66 .67	-.01 -.09	.04	.21	-.02
5. Property crime rate					-.19 -.21(-.03)[b]	-.11	.10	.02
6. Police per 1000 population						.26	.14	-.28
7. 1976 city population							-.26	-.43
8. Average age of survey respondents								.30
9. % of respondents owning their own home								

a. N = 23 cities except for correlations involving police force size (N = 19). In each cell, the first entry is the zero-order correlation. The second entry is a partial correlation controlling on city size, average age of respondents, and % owing their own home.

b. Correlation coefficient when Victoria is omitted from the sample (N = 22 or 18). Only those situations where the omission of this 'outlier' substantially alters the coefficient (changes of ± .10) are reported.

more police officers in some Canadian cities than in others is not paralleled by lower levels of fear of crime. However, the presence of more police officers is associated with fewer individual initiatives to prevent crime. The correlations between the police staffing rate and parallel production measures are negative and of weak to moderate strength (-.33 and -.35). These aggregate data do not allow firm individual-level conclusions, but several could be proposed. Under-staffed police forces in some Canadian cities may actively encourage citizens to make extra efforts to prevent crimes, or urban residents recognizing that police protection is minimal may make such efforts on their own initiative.

The correlations between the police staffing rate and crime rates are also of interest: the size of the police force does not covary with violent crime rates (r = -.01) and is only weakly associated with property crime rates (r = -.19). In short, while none of these zero-order associations is of substantial size, the most noteworthy are between the staffing ratio and parallel production. When comparing large Canadian cities, the size of the police force appears to have little impact on either the rates of crime or on residents' fear of crime. However, cities with relatively small police forces have residents who make more individual efforts to prevent crime.

Included in Table 2 are zero-order correlations among the three control variables and these six other variables of interest. Briefly noting some of the more interesting relationships, we see more parallel production in cities where home-ownership is more widespread (r = .24 and .22). This may reflect the fact that home-owners would be more likely to take initiatives to crime-proof their homes. In cities where the average age of residents is higher, we see fewer individual protection behaviors (r = -.25) reflecting, perhaps, a greater tendency towards such initiatives among younger people. These explanations of aggregate level relationships are, of course, relying on assumptions about how individuals behave, and analyses of individual-level data would really be necessary to confirm these interpretations.[4]

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[4]Table 2 reveals an example of the danger of using individual-level explanations to explain aggregate data. The fear of crime literature (at the individual level of analysis) consistently shows that older individuals report more fear, leading us to expect that in cities with older residents, the average level of fear of crime would be higher.

These control variables may be influencing the relationships among the central variables of interest in this study, so Table 2 also displays the partial correlations among fear of crime, the parallel production measures, the crime rates, and the police staffing rate, controlling on population size, average age of residents, and home-ownership level. While some of the partial correlations are slightly larger or slightly smaller than the comparable zero-order coefficients, it is apparent that we need not worry about possible spurious or suppressed effects. Consequently, in the following multi-variate analyses, these three control variables are not re-introduced.

We can see from the above results that there are some fairly strong relationships between the structural characteristics of cities and residents' behavioral and attitudinal responses to crime. However, these correlational analyses leave some important questions unanswered. First, while we observe that cities with higher levels of fear also have citizens more likely to take actions to protect themselves, we can still ask whether this relationship would remain after controlling on crime rates and the size of the local police force. Second, we observe associations between crime rates and parallel production as well as between crime rates and average level of fear. Is, then, the association between crime rates and parallel production a direct one, or an indirect one via fear of crime? Third, Table 2 revealed a negative correlation between policing level and parallel production activities, suggesting that individual initiatives diminish with increases in the size of formal security agencies. Does this relationship remain after controlling on crime rates and average level of fear of crime?

Answers to these three questions are found in the path models shown in Figure 1. Since police force size information was only available for 19 cities, the sample for these analyses is reduced from 23 to 19. As we have made no effort to hypothesize how personal protection behavior might influence or be influenced by home protective actions, or how property and violent crime rates may affect each other, we present four separate path models in which the crime rates and the parallel production measures are interchanged.[5]

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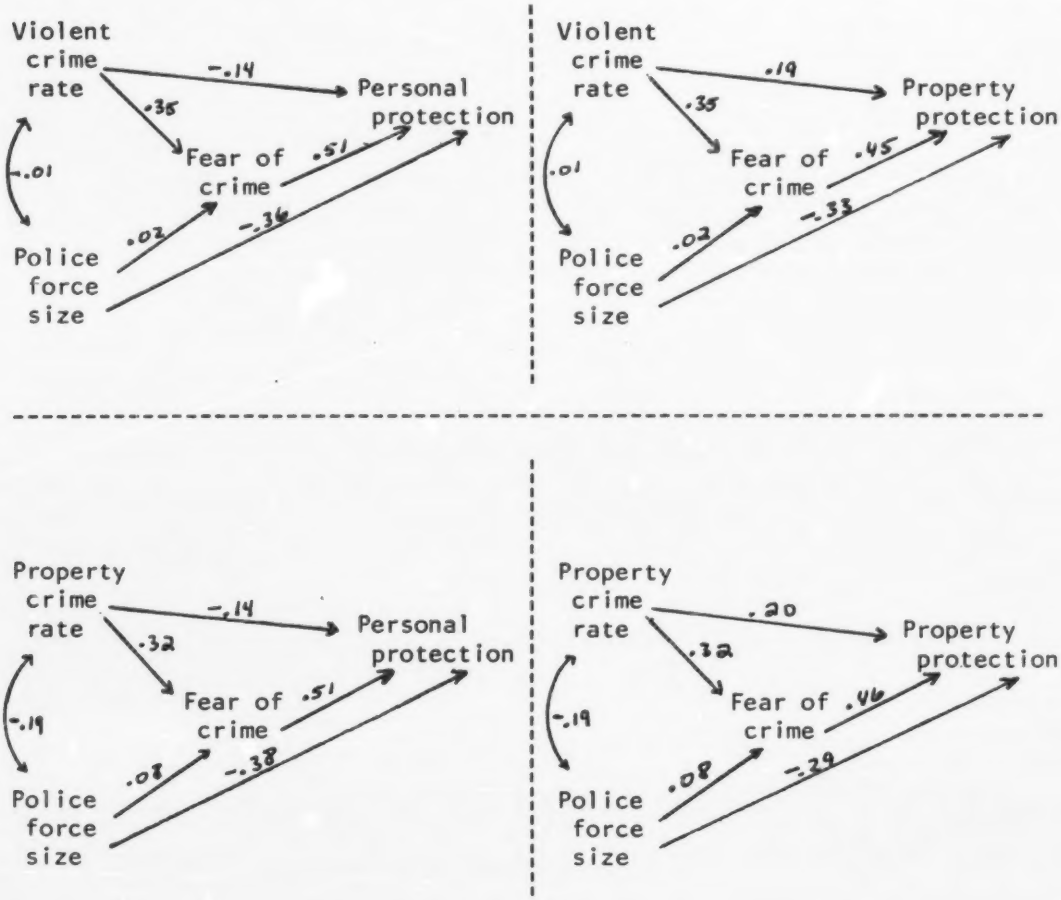
[5]Victoria is included in these analyses, but dropping this outlying city and reducing the sample to 18 produces no important changes in our conclusions.

Figure 1: Path models linking parallel production measures, fear of crime, crime rates and police force size.[a]



a. N = 19 since data on police force size was not available for four cities.

For both property and violent crimes, fear of crime has substantial net effects on the parallel production measures, controlling on the crime rate in question and on the size of the police force. All of these path coefficients are between .45 and .51. Other researchers working with individual-level data have suggested that there is not a systematic relationship between fear and parallel production (Warren et al., 1984). These city-level data show a very consistent pattern, across cities with different crime rates and different sizes of police force, of more fear being associated with more individual crime-prevention activities. Feelings of personal insecurity appear to lead to behavioral responses to enhance protection.

A large part of the effects of crime rates (both types) on parallel production are indirect through fear of crime. While the zero-order correlations linking crime rates with home protection were .44 and .49, the path coefficients representing the direct effects of violent crime (.19) and property crime (.20) on such behavior are less than half the size. Similarly, while the zero-order correlations between crime rates and personal protection behavior were of weak to moderate strength (.18 and .26), the comparable path coefficients are weaker and actually negative (both are -.14). Thus, the best model appears to be one in which characteristics of cities (crime rates) influence attitudes (fear of crime) which in turn have an effect on behavior (parallel production). Other researchers (e.g. Riger et al., 1981) have reported that crime rates do have an impact on behaviors via fear. This analysis highlights more specifically the nature of such behavioral responses.

The inclusion of police force size in these path models does not alter this basic three-variable pattern. As the correlation matrix revealed earlier, size of the local police force has no appreciable effect on levels of fear of crime in these Canadian cities. Since police force size also is basically unrelated to crime rates, the direct and indirect effects of crime rates on parallel production are not influenced by the presence of this fourth variable in the models. Instead, we note one consistent finding. For both types of crime rates, and for both personal protection and home protection behavior, a larger police force is associated with fewer citizen initiatives towards crime prevention. All four of the path coefficients are negative and of weak to moderate strength (between -.29 and -.38).

The overall impression left by the path models in Figure 1 is that there are two distinct processes which may influence parallel production of crime prevention services. On the one hand, higher crime rates (among a variety of other factors not considered in this analysis) can increase the level of fear of crime in a city and thus, indirectly, lead to more citizen initiatives. On the other hand, a lower level of policing in some cities may encourage individual urban residents to take actions to reduce their vulnerability to crime. The two processes seem to be largely independent.[6]

Summary and Discussion

Using aggregate data from a sample of 23 Canadian cities, we have examined the relationships among city characteristics (crime rates and police staffing rates), the level of fear of crime among residents, and two measures of parallel production of crime prevention services by city residents. Bivariate analyses revealed positive correlations between fear of crime and the degree to which citizens make efforts to protect themselves and their property from crime. In addition, both violent and property crime rates were positively associated with fear of crime and with these city-level indicators of parallel production. While the size of the local police force does not covary systematically with either crime rates or the city average for fear of crime, there is a negative association between the police staffing level and the parallel production indices. The larger the police force, the less city residents are inclined to take individual crime prevention initiatives.

A series of path analyses in which the crime rates and parallel production measures were interchanged demonstrated that the effects of crime rates on citizen actions were largely indirect via fear of crime. The higher the crime rates in a city, the greater the average fear of crime, and the more likely city residents would act to reduce their vulnerability to crime. The impact of police staffing levels appeared to be independent of this other process. The path analyses confirmed what the correlation

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[6]Figure 1 contains path models based on reduced samples of 19 cities. Given that the effects of police force size on parallel production appear to be independent of the effects of crime rates and fear of crime, these latter effects could be examined with the full sample of 23 cities if police force size was dropped from the path models. Further path analyses (results not shown) based on the full sample and incorporating only the crime rates, parallel production measures, and fear of crime revealed no important differences.

analyses had suggested: Cities with larger police forces contain residents less inclined to take personal crime-prevention initiatives.

This study is the first to have examined the impact of city characteristics on both fear of crime and parallel production. While our analyses showed that city size, average age of residents, and prevalence of home ownership did not influence these basic aggregate relationships, additional research could focus on other city features (e.g. type of policing, housing characteristics, racial and ethnic mix) which might have some explanatory value. The previous research on this subject has been at the individual level of analysis. Further research of that type could usefully go on to consider the possible contextual effects of city characteristics like crime rates on these individual-level relationships.

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